

MODULE 2
Airway
Lesson 2-1
Airway

Objectives

Objectives Legend

C = Cognitive P = Psychomotor A = Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

At the completion of this lesson, the EMT-Basic student will be able to:

- 2-1.1 Name and label the major structures of the respiratory system on a diagram.(C-1)
- 2-1.2 List the signs of adequate breathing.(C-1)
- 2-1.3 List the signs of inadequate breathing.(C-1)
- 2-1.4 Describe the steps in performing the head-tilt chin-lift.(C-1)
- 2-1.5 Relate mechanism of injury to opening the airway.(C-3)
- 2-1.6 Describe the steps in performing the jaw thrust.(C-1)
- 2-1.7 State the importance of having a suction unit ready for immediate use when providing emergency care.(C-1)
- 2-1.8 Describe the techniques of suctioning.(C-1)
- 2-1.9 Describe how to artificially ventilate a patient with a pocket mask.(C-1)
- 2-1.10 Describe the steps in performing the skill of artificially ventilating a patient with a bag-valve-mask while using the jaw thrust.(C-1)
- 2-1.11 List the parts of a bag-valve-mask system.(C-1)
- 2-1.12 Describe the steps in performing the skill of artificially ventilating a patient with a bag-valve-mask for one and two rescuers.(C-1)
- 2-1.13 Describe the signs of adequate artificial ventilation using the bag-valve-mask.(C-1)
- 2-1.14 Describe the signs of inadequate artificial ventilation using the bag-valve-mask.(C-1)
- 2-1.15 Describe the steps in artificially ventilating a patient with a flow restricted, oxygen-powered ventilation device.(C-1)
- 2-1.16 Describe the steps in performing the actions taken when providing mouth-to-mouth and mouth-to-stoma artificial ventilation.(C-1)
- 2-1.17 Describe how to measure and insert an oropharyngeal (oral) airway.(C-1)
- 2-1.18 Describe how to measure and insert a nasopharyngeal (nasal) airway.
- 2-1.19 Define the components of an oxygen delivery system.(C-1)
- 2-1.20 Identify a non rebreather face mask and state the oxygen flow requirements needed for its use.(C-1)
- 2-1.21 Describe the indications for using a nasal cannula versus a non rebreather face mask.(C-1)
- 2-1.22 Identify a nasal cannula and state the flow requirements needed for its use.(C-1)

AFFECTIVE OBJECTIVES

At the completion of this lesson, the EMT-Basic student will be able to:

- 2-1.23 Explain the rationale for basic life support artificial ventilation and airway protective skills taking priority over most other basic life support skills.
- 2-1.24 Explain the rationale for providing adequate oxygenation through high inspired oxygen concentrations to patients who, in the past, may have received low concentrations.(A-3)

PSYCHOMOTOR OBJECTIVES

At the completion of this lesson, the EMT-Basic student will be able to:

- 2-1.25 Demonstrate the steps in performing the head-tilt chin-lift. (P-1,2)
- 2-1.26 Demonstrate the steps in performing the jaw thrust.(P-1,2)
- 2-1.27 Demonstrate the techniques of suctioning.(P-1,2)
- 2-1.28 Demonstrate the steps in providing mouth-to-mouth artificial ventilation with body substance isolation (barrier shields).(P-1,2)
- 2-1.29 Demonstrate how to use a pocket mask to artificially ventilate a patient.
- 2-1.30 Demonstrate the assembly of a bag-valve-mask unit.(P-1,2)
- 2-1.31 Demonstrate the steps in performing the skill of artificially ventilating a patient with a bag-valve-mask for one and two rescuers.(P-1,2)
- 2-1.32 Demonstrate the steps in performing the skill of artificially ventilating a patient with a bag-valve-mask while using the jaw thrust.(P-1,2)
- 2-1.33 Demonstrate artificial ventilation of a patient with a flow restricted, oxygen-powered ventilation device.(P-1,2)
- 2-1.34 Demonstrate how to artificially ventilate a patient with a stoma.(P-1,2)
- 2-1.35 Demonstrate how to insert an oropharyngeal (oral) airway.(P-1,2)
- 2-1.36 Demonstrate how to insert a nasopharyngeal (nasal) airway.(P-1,2)
- 2-1.37 Demonstrate the correct operation of oxygen tanks and regulators / flowmeters.(P-1,2)
- 2-1.38 Demonstrate the use of a non rebreather face mask and state the oxygen flow requirements needed for its use.(P-1,2)
- 2-1.39 Demonstrate the use of a nasal cannula and state the flow requirements needed for its use.(P-1,2)
- 2-1.40 Demonstrate how to artificially ventilate the infant and child patient.(P-1,2)
- 2-1.41 Demonstrate oxygen administration for the infant and child patient.(P-1,2)

Preparation

Motivation: A patient without an airway is a dead patient.

Prerequisites: BLS (CPR) and Preparatory.

MATERIALS

AV Equipment: Utilize various audio-visual materials relating to airway management. The continuous design and development of new audio-visual materials relating to EMS requires careful review to determine which best meet the needs of the

program. Materials should be edited to assure the objectives of the curriculum are met.

EMS Equipment: Pocket mask, bag-valve-mask, flow restricted, oxygen-powered ventilation device, oral airways, nasal airways, suction units, suction catheters, oxygen tank, regulator, non rebreather mask, nasal cannula, tongue blade, and lubricant, airway management training manikins, and CPR manikins .

PERSONNEL

Primary Instructor: One EMT-Basic instructor knowledgeable in airway management.

Assistant Instructor: The instructor-to-student ratio of no more than 1:6 for psychomotor skill practice. Individuals used as assistant instructors should be knowledgeable in airway techniques and management.

Recommended Minimum
Time to Complete: Four hours

Presentation

Declarative (What)

- I. Anatomy review
 - A. Respiratory System
 1. Nose and mouth
 2. Pharynx
 - a. Oropharynx
 - b. Nasopharynx
 3. Epiglottis - a leaf-shaped structure that prevents food and liquid from entering the trachea during swallowing.
 4. Trachea (windpipe)
 5. Cricoid cartilage - firm cartilage ring forming the lower portion of the larynx.
 6. Larynx (voice box)
 7. Bronchi - two major branches of the trachea to the lungs. Bronchus subdivides into Bronchioles, which are the smaller air passages ending at the alveoli.
 8. Alveoli
 9. Lungs
 10. Diaphragm
 - a. Inhalation (active)
 - (1) Diaphragm and intercostal muscles contract, increasing the size of the thoracic cavity.
 - (a) Diaphragm moves slightly downward, flares lower portion of rib cage.
 - (b) Ribs move upward/outward.
 - (2) Air flows into the lungs.
 - b. Exhalation (passive)
 - (1) Diaphragm and intercostal muscles relax, decreasing the size of the thoracic cavity.
 - (a) Diaphragm moves upward.
 - (b) Ribs move downward/inward.
 - (2) Air flows out of the lungs.
 11. Respiratory physiology
 - a. Alveolar/capillary exchange
 - (1) Oxygen-rich air enters the alveoli during each inspiration.
 - (2) Oxygen-poor blood in the capillaries passes into the alveoli.
 - (3) Oxygen enters the capillaries as carbon dioxide enters the alveoli.
 - b. Capillary/cellular exchange
 - (1) Cells give up carbon dioxide to the capillaries.
 - (2) Capillaries give up oxygen to the cells.
 - c. Adequate breathing
 - (1) Normal Rate

- (a) Adult - 12-20/minute
 - (b) Child - 15-30/minute
 - (c) Infant - 25-50/minute
 - (2) Rhythm
 - (a) Regular
 - (b) Irregular
 - (3) Quality
 - (a) Breath sounds - present and equal
 - i) Free of gurgling, gasping, crowing, and wheezing
 - (4) Chest expansion - adequate and equal
 - (a) Minimum effort of breathing - use of accessory muscles - predominantly in infants and children
 - (5) Depth (tidal volume) -
 - (a) adequate and equal expansion of both sides of chest.
 - d. Inadequate breathing
 - (1) Rate - outside of normal ranges.
 - (2) Rhythm - irregular
 - (3) Quality
 - (a) Breath sounds - diminished or absent
 - (b) Chest expansion - unequal or inadequate
 - (c) Increased effort of breathing - use of accessory muscles - predominantly in infants and children
 - (4) Depth (tidal volume) - inadequate/shallow
 - (5) The skin may be pale or cyanotic (blue) and cool and clammy.
 - (6) There may be retractions above the clavicles, between the ribs and below the rib cage, especially in children.
 - (7) Nasal flaring may be present, especially in children.
 - (8) In infants, there may be "seesaw" breathing where the abdomen and chest move in opposite directions.
 - (9) Agonal respirations (occasional gasping breaths) may be seen just before death.
12. Infant and child anatomy considerations
- a. Mouth and nose - in general: All structures are smaller and more easily obstructed than in adults.
 - b. Pharynx - infant's and children's tongues take up proportionally more space in the mouth than adults.
 - c. Trachea (windpipe)
 - (1) Infants and children have narrower tracheas that are obstructed more easily by swelling.
 - (2) The trachea is softer and more flexible in infants and

children.

- d. Cricoid cartilage - like other cartilage in the infant and child, the cricoid cartilage is less developed and less rigid.
- e. Diaphragm - chest wall is softer, infants and children tend to depend more heavily on the diaphragm for breathing.

B. Adequate and inadequate artificial ventilation

- 1. An EMT-Basic is artificially ventilating a patient adequately when:
 - a. The chest rises and falls with each artificial ventilation.
 - b. The rate is sufficient, approximately 12 per minute for adults and 20 times per minute for children and infants.

NOTE: Heart rate may return to normal with successful artificial ventilation.

- 2. Artificial ventilation is inadequate when:
 - a. The chest does not rise and fall with artificial ventilation.
 - b. The rate is too slow or too fast.

NOTE: Heart rate may not return to normal with artificial ventilation.

II. Opening the Airway

- A. Head-tilt chin-lift when no neck injury suspected - review technique learned in BLS course.
- B. Jaw thrust when EMT-Basic suspects spinal injury - review technique learned in BLS course.
- C. Assess need for suctioning.

III. Techniques of Suctioning

A. Body substance isolation

B. Purpose

- 1. Remove blood, other liquids and food particles from the airway.
- 2. Some suction units are inadequate for removing solid objects like teeth, foreign bodies and food.
- 3. A patient needs to be suctioned immediately when a gurgling sound is heard with artificial ventilation.

C. Types of units

1. Suction devices

- a. Mounted
- b. Portable
 - (1) Electrical
 - (2) Hand operated

2. Suction catheters

- a. Hard or rigid ("tonsil sucker," "tonsil tip")
 - (1) Used to suction the mouth and oropharynx of an unresponsive patient.
 - (2) Should be inserted only as far as you can see.
 - (3) Use rigid catheter for infants and children, but take caution not to touch back of airway.
- b. Soft (French)

- (1) Useful for suctioning the nasopharynx and in other situations where a rigid catheter cannot be used.
- (2) Should be measured so that it is inserted only as far as the base of the tongue.

D. Techniques for use on a person who has an airway established

1. Suction device should be inspected on a regular basis before it is needed. A properly functioning unit with a gauge should generate 300 mmHg vacuum. A battery operated unit should have a charged battery.
2. Turn on the suction unit.
3. Attach a catheter.
 - a. Use rigid catheter
 - b. Nasal passages often require suctioning use a bulb suction or French catheter with low to medium suction.
4. Insert the catheter into the oral cavity.
5. Apply suction. Suction as long as necessary to remove any substances interfering with proper ventilation.
6. Suction for no more than 15 seconds at a time unless additional suctioning is necessary to clear the airway.
 - a. If the patient has secretions or emesis that cannot be removed quickly and easily by suctioning, the patient should be log rolled and the oropharynx should be cleared.
NOTE: Differentiate between stomach and lung contents.
 - b. If patient produces frothy secretions as rapidly as suctioning can remove, suction for 15 seconds, artificially ventilate for two minutes, then suction for 15 seconds, and continue in that manner.
7. If necessary, rinse the catheter and tubing with water to prevent obstruction of the tubing from dried material.

IV. Airway Adjuncts

A. Oropharyngeal (oral) airways

1. Oropharyngeal airways may be used to assist in maintaining an open airway on unresponsive patients without a gag reflex. Patients with a gag reflex will vomit.
2. Select the proper size: Measure the airway from the corner of the patient's mouth to the tip of the ear lobe or measure from the center of the patient's mouth to the angle of the lower jaw.
3. Open the patient's mouth.
4. In adults, to avoid obstructing the airway with the tongue, insert the airway upside down, with the tip facing toward the roof of the patient's mouth.
NOTE: There are variety of ways to insert an oropharyngeal airway. This is one method of insertion.
5. Advance the airway gently until resistance is encountered. Turn the airway 180 degrees so that it comes to rest with the flange on

- the patient's teeth.
- 6. Another method of inserting an oral airway is to insert it right side up, using a tongue depressor to press the tongue down and forward to avoid obstructing the airway. This is the preferred method for airway insertion in an infant or child.
- B. Nasopharyngeal (nasal) airways
 - 1. Nasopharyngeal airways are less likely to stimulate vomiting and may be used on patients who are responsive but need assistance maintaining an airway. Even though the tube is lubricated, this is a painful stimulus.
 - 2. Select the proper size: Measure from the tip of the nose to the tip of the patient's ear. Also consider diameter of airway in the nostril.
 - 3. Lubricate the airway with a water soluble lubricant.
 - 4. Insert it posteriorly. Bevel should be toward the base of the nostril or toward the septum. The right nostril is preferred.
 - 5. If the airway cannot be inserted into one nostril, try the other nostril.
- V. Oxygen
 - A. Oxygen cylinders
 - 1. Different sizes
 - a. D cylinder has 350 liters
 - b. E cylinder has 625 liters
 - c. M cylinder has 3,000 liters
 - d. G cylinder has 5,300 liters
 - e. H cylinder has 6,900 liters
 - 2. Need to handle carefully since their contents are under pressure.
 - 3. Tanks should be positioned to prevent falling and blows to the valve-gauge assembly and secured during transport.
 - B. Pressure regulators
 - 1. Full tank approximately 2000 psi. Varies with ambient temperature.
 - 2. Dry oxygen not harmful in short term; humidifier needed only for patient on oxygen for a long time.
 - C. Operating procedures
 - 1. Remove protective seal.
 - 2. Quickly open, then shut, the valve.
 - 3. Attach regulator-flowmeter to tank.
 - 4. Open and close oxygen tank valve to check for leaks and pressure.
 - 5. Attach oxygen device to flowmeter.
 - 6. Open flowmeter to desired setting.
 - 7. Apply oxygen device to patient.
 - 8. When complete, remove device from patient, then turn off valve and remove all pressure from the regulator.
 - D. Equipment for oxygen delivery
 - 1. Non rebreather mask

- a. Preferred method of giving oxygen to prehospital patients.
 - b. Up to 90% oxygen can be delivered.
 - c. Non rebreather bag must be full before mask is placed on patient.
 - d. Flow rate should be adjusted so that when patient inhales, bag does not collapse (15 LPM).
 - e. Patients who are cyanotic, cool, clammy or short of breath need oxygen. Concerns about the dangers of giving too much oxygen to patients with history of chronic obstructive pulmonary disease and infants and children have not been shown to be valid in the prehospital setting. Patients with chronic obstructive pulmonary disease and infants and children who require oxygen should receive high concentration oxygen.
 - f. Masks come in different sizes for adult, children and infants. Be sure to select the correct size mask.
2. Nasal cannula - rarely the best method of delivering adequate oxygen to the prehospital patient. Should be used only when patients will not tolerate a non rebreather mask, despite encouragement, explanation and instruction from the EMT-Basic.

VI. Techniques of Artificial Ventilation

- A. In order of preference, the methods for ventilating a patient by the EMT-Basic are as follows:
 1. Mouth-to-mask
 2. Two-person bag-valve-mask
 3. Flow restricted, oxygen-powered ventilation device
 4. One-person bag-valve-mask
- B. Body substance isolation
- C. Mouth-to-mouth - review technique learned in BLS course.
NOTE: Not Recommended
- D. Airway adjunct use should always be considered.
- E. Mouth-to-mask
 1. Review technique learned in BLS course.
 2. The mask should be connected to high flow oxygen = 15 liters per minute.
- F. Bag-valve-mask
 1. The bag-valve-mask consists of a self-inflating bag, one-way valve, face mask, oxygen reservoir. Oxygen should be used for most effective performance.
 2. Bag-valve-mask issues:
 - a. Volume of approximately 1,600 milliliters
 - b. Provides less volume than mouth-to-mask
 - c. Single EMT-Basic may have difficulty maintaining an airtight seal.
 - d. Two EMT-Basics using the device will be more effective.

- e. Position self at top of patient's head for optimal performance.
 - f. Adjunctive airways (oral or nasal) may be necessary in conjunction with bag-valve-mask.
 - g. The bag-valve-mask should:
 - (1) Be a self-refilling bag that is easily cleaned and sterilized.
 - (a) Disposable is preferred
 - (b) Non disposable must be cleaned and sterilized.
 - (2) have a non-jam valve that allows a maximum oxygen inlet flow of 15 LPM.
 - (3) have no pop-off valve, or the pop-off valve must be disabled. Failure to do so may result in inadequate artificial ventilations.
 - (4) have standardized 15/22 mm fittings.
 - (5) have an oxygen inlet and reservoir to allow for high concentration of oxygen.
 - (6) have a one way valve to prevent patient from rebreathing expired air.
 - (7) have the ability to function in all environmental conditions and temperature extremes.
 - (8) have appropriate infant, child and adult sizes of masks and bags available.
 - h. Selecting and sizing a mask
 - (1) Have an air cushion
 - (2) Clear face piece
 - (3) Apex (top) of mask is placed on bridge of nose
 - (4) Base of the mask is placed in the groove between the lower lip and the chin.
3. When no spinal trauma is suspected.
- a. After opening airway, place appropriate sized airway adjunct and select correct mask size (adult, infant or child).
 - b. Connect bag to mask and oxygen if not already done.
 - c. Position thumbs over top half of mask, index and middle fingers over bottom half.
 - d. Place apex of mask over bridge of nose, then lower mask over mouth and upper chin. If mask has large round cuff surrounding a ventilation port, center port over mouth.
 - e. Use ring and little fingers to bring jaw up to mask.
 - f. Have assistant squeeze bag with two hands until chest rises.
 - g. If alone, form a "C" around the ventilation port with thumb and index finger; use middle, ring and little fingers under jaw to maintain chin lift and complete the seal. Using the other hand, squeeze the bag until the chest rises.

- h. Ventilate a minimum of every 5 seconds for adults and every 3 seconds for children and infants.
 - i. If chest does not rise and fall, re-evaluate.
 - (1) If chest does not rise, reposition head.
 - (2) If air is escaping from under the mask, reposition fingers and mask.
 - (3) Check for obstruction.
 - (4) If chest still does not rise and fall, use alternative method of artificial ventilation, e.g., pocket mask, manually triggered device.
- 4. When spinal trauma is suspected.
 - a. Immobilize head and neck, e.g., have an assistant hold head manually or use your knees to prevent movement.
 - b. After opening airway using spinal precautions, place appropriate sized airway adjunct and select correct mask size (adult, infant or child).
 - c. Connect bag to mask and oxygen if not already done.
 - d. Position thumbs over top half of mask, index and middle fingers over bottom half.
 - e. Place apex of mask over bridge of nose, then lower mask over mouth and upper chin. If mask has large round cuff surrounding a ventilation port, center port over mouth.
 - f. Use ring and little fingers to bring jaw up to mask without tilting head or neck.
 - g. Have assistant squeeze bag with two hands until chest rises.
 - h. Repeat every 5 seconds for adults and every 3 seconds for children and infants, continuing to hold jaw up without moving head or neck.
 - i. If chest does not rise, re-evaluate.
 - (1) If abdomen rises, reposition jaw.
 - (2) If air is escaping from under the mask, reposition fingers and mask.
 - (3) Check for obstruction.
 - (4) If chest still does not rise, use alternative method of artificial ventilation, e.g., pocket mask.
- G. Flow restricted, oxygen-powered ventilation devices (Manually triggered, positive pressure device)
 - 1. Flow restricted, oxygen-powered ventilation devices (for use in adults only) should provide:
 - a. A peak flow rate of 100% oxygen at up to 40 LPM.
 - b. An inspiratory pressure relief valve that opens at approximately 60 centimeters water and vents any remaining volume to the atmosphere or ceases gas flow.
 - c. An audible alarm that sounds whenever the relief valve pressure is exceeded.

- d. Satisfactory operation under ordinary environmental conditions and extremes of temperature.
 - e. A trigger positioned so that both hands of the EMT-Basic can remain on the mask to hold it in position.
2. Use when no spinal injury is suspected
- a. After opening airway, place appropriate sized airway adjunct and select correct adult mask size.
 - b. Connect flow restricted, oxygen-powered ventilation device to mask if not already done.
 - c. Position thumbs over top half of mask, index and middle fingers over bottom half.
 - d. Place apex of mask over bridge of nose, then lower mask over mouth and upper chin.
 - e. Use ring and little fingers to bring jaw up to mask.
 - f. Trigger the flow restricted, oxygen-powered ventilation device until chest rises.
 - g. Repeat every 5 seconds.
 - h. If chest does not rise, re-evaluate.
 - (1) If abdomen rises, reposition head.
 - (2) If air is escaping from under the mask, reposition fingers and mask.
 - (3) If chest still does not rise, use alternative method of artificial ventilation, e.g., pocket mask.
 - (4) Check for obstruction.
3. Use when there is suspected neck injury.
- a. Immobilize head and neck, e.g., have an assistant hold head manually or use your knees to prevent movement.
 - b. Connect flow restricted, oxygen-powered ventilation device to mask, if not already done.
 - c. After opening airway using spinal precautions, place appropriate sized airway adjunct and select correct adult mask size.
 - d. Position thumbs over top half of mask, index and middle fingers over bottom half.
 - e. Place apex of mask over bridge of nose, then lower mask over mouth and upper chin.
 - f. Use ring and little fingers to bring jaw up to mask without tilting head or neck.
 - g. Trigger the flow restricted, oxygen-powered ventilation device until chest rises.
 - h. Repeat every 5 seconds.
 - i. If chest does not rise and fall, re-evaluate.
 - (1) If chest does not rise and fall, reposition jaw.
 - (2) If air is escaping from under the mask, reposition fingers and mask.
 - (3) If chest still does not rise, use alternative method of

artificial ventilation, e.g., pocket mask.

(4) Check for obstruction.

- H. Mask to stoma or tracheostomy tube
 - 1. Definition of tracheostomy - an artificial permanent opening in the trachea.
 - 2. If unable to artificially ventilate, try suction, then artificial ventilation through mouth and nose; sealing stoma may improve ability to artificially ventilate from above or may clear obstruction.
 - 3. Need to seal the mouth and nose when air is escaping when artificially ventilating at the stoma.
- I. Bag-valve-mask to stoma - use infant and child mask to make seal. Technique otherwise very similar to artificially ventilating through mouth. Head and neck do not need to be positioned.

VII. Special Considerations

- A. Patients with laryngectomies (stomas)
 - 1. A breathing tube may be present. If it is obstructed, suction it.
 - 2. Some patients have partial laryngectomies. If, upon artificially ventilating stoma, air escapes from the mouth or nose, close the mouth and pinch the nostrils.
- B. Infant and child patients
 - 1. Place head in correct neutral position for the infant and extend a little past neutral for a child.
 - 2. Avoid excessive hyperextension of the head.
 - 3. Avoid excessive bag pressure - use only enough to make chest rise.
 - 4. Ventilate with bag-valve-mask until adequate chest rise occurs. Do not use pop-off valve, must be disabled (placed in closed position) in order to adequately ventilate child or infant.
 - 5. Gastric distention is more common in children.
 - 6. An oral or nasal airway may be considered when other procedures fail to provide a clear airway.
- C. Facial injuries
 - 1. Because the blood supply to the face is so rich, blunt injuries to the face frequently result in severe swelling.
 - 2. For the same reason, bleeding into the airway from facial injuries can be a challenge to manage.
- D. Obstructions
 - 1. Review the foreign body airway obstruction (FBAO) procedures that the students learned in their BLS training.
 - 2. When foreign body airway obstruction persists, EMT-Basics should perform two cycles of the FBAO procedure, then transport, continuing the FBAO procedure en route.
- E. Dental appliances
 - 1. Dentures - ordinarily dentures should be left in place.
 - 2. Partial dentures (plates) may become dislodged during an

emergency. Leave in place, but be prepared to remove it if it becomes dislodged.

Suggested Application

Procedural (How)

1. Show diagrams of the airway and respiratory system of adults, children and infants.
2. Show examples of inadequate breathing.
3. Demonstrate the head-tilt chin-lift method of opening the airway.
4. Demonstrate the jaw thrust method of opening the airway.
5. Demonstrate mouth-to-mouth artificial ventilation of a patient using barrier precaution.
6. Demonstrate artificial ventilation of a patient with a pocket mask with oxygen.
7. Demonstrate assembly of a bag-valve-mask.
8. Use a bag-valve-mask to demonstrate artificial ventilation of a non-spine injured patient with and without assistance.
9. Use a bag-valve-mask to demonstrate artificial ventilation of a suspected spinal injured patient with and without assistance.
10. Demonstrate artificial ventilation of a non-spine injured patient with a flow restricted, oxygen-powered ventilation device.
11. Demonstrate artificial ventilation of a spine injured patient with a flow restricted, oxygen-powered ventilation device.
12. Demonstrate insertion of an oropharyngeal (oral) airway.
13. Demonstrate insertion of a nasopharyngeal (nasal) airway.
14. Demonstrate how to check a suction unit.
15. Demonstrate the techniques of suctioning.
16. Demonstrate use of a nasal cannula.
17. Demonstrate use of a non rebreather mask.
18. Demonstrate correct operation of oxygen tanks and regulators.
19. Demonstrate artificial ventilation of a patient with a stoma.
20. Demonstrate artificial ventilation of an infant or child patient.

Contextual (When, Where, Why)

Every patient must have a patent airway to survive. When the airway is obstructed, the EMT-Basic must clear it as soon as possible using the methods described in this lesson. The only exceptions to this would be situations where it is unsafe or the airway problem is such that it cannot be treated in the field and the patient must be transported immediately to a hospital.

Once the airway has been opened, the EMT-Basic must determine if breathing is adequate. Patients with inadequate breathing must be artificially ventilated using mouth-to-mouth, mouth-to-mask, bag-valve-mask or flow restricted, oxygen-powered ventilation device. If the patient has adequate breathing, the EMT-Basic must decide if oxygen is indicated. If oxygen is necessary, the EMT-Basic must select the appropriate device and follow the procedure for delivery

STUDENT ACTIVITIES

Auditory (Hear)

1. The student should hear abnormal airway sounds such as gurgling, snoring, stridor, and expiratory grunting.
2. The student should hear a bag-valve-mask being used on a patient with an open airway.
3. The student should hear a bag-valve-mask being used on a patient with an obstructed airway.
4. The student should hear a flow restricted, oxygen-powered ventilation device being used on a patient with an open airway.
5. The student should hear a flow restricted, oxygen-powered ventilation device being used on a patient with an obstructed airway.
6. The student should hear suction units being operated.
7. The student should hear an oxygen tank and flowmeter in operation.

Visual (See)

1. The student should see audio-visual aids or materials of the airway and respiratory system.
2. The student should see normal breathing in other students.
3. The student should see audio-visual aids or materials of abnormal breathing.
4. The student should see audio-visual aids or materials of patients with stomas.
5. The student should see different kinds of oral and nasal airways.
6. The student should see different devices for ventilating patients (pocket masks, bag-valve-masks).
7. The student should see different kinds of suction units.
8. The student should see different kinds of oxygen tanks, regulators, and flowmeters.
9. The student should see non rebreather masks and nasal cannulas.
10. The student should see audio-visual aids or materials of various dental appliances.

Kinesthetic (Do)

1. The student should practice evaluating breathing for adequacy.
2. The student should practice opening the airway with the head-tilt chin-lift maneuver.
3. The student should practice opening the airway with the jaw thrust.
4. The student should practice mouth-to-mouth artificial ventilation.
5. The student should practice artificial ventilation of a patient with a pocket mask with oxygen.
6. The student should practice assembly of a bag-valve-mask.
7. The student should practice using a bag-valve-mask to artificially ventilate a non-spine injured patient (adult, child, and infant) with and without assistance.
8. The student should practice using a bag-valve-mask to artificially ventilate a spinal injured patient (adult, child, and infant) with assistance.
9. The student should practice artificial ventilation of a non-spine injured patient with a flow restricted, oxygen-powered ventilation device.

10. The student should practice artificial ventilation of a spine injured patient with a flow restricted, oxygen-powered ventilation device.
11. The student should practice insertion of an oropharyngeal (oral) airway (adult, child, and infant) with and without tongue blade.
12. The student should practice insertion of a nasopharyngeal (nasal) airway.
13. The student should practice checking a suction unit.
14. The student should practice suctioning.
15. The student should practice using a nasal cannula.
16. The student should practice using a non rebreather mask.
17. The student should practice correct operation of oxygen tanks, regulators, and flowmeters.
18. The student should practice artificial ventilation of a patient with a stoma.
19. The student should practice artificial ventilation of an infant or child patient.

INSTRUCTOR ACTIVITIES

Supervise student practice.

Reinforce student progress in cognitive, affective, and psychomotor domains.

Redirect students having difficulty with content (complete remediation forms).

Evaluation

Written: Develop evaluation instruments, e.g., examinations, verbal reviews, and handouts, to determine if the students have met the cognitive and affective objectives of this lesson.

Practical: Evaluate the actions of the EMT-Basic students during role play, practice or other skill stations to determine their compliance with the cognitive and affective objectives and their mastery of the psychomotor objectives of this lesson.

Remediation

Identify students or groups of students who are having difficulty with this subject content. Complete remediation sheet from the instructor's course guide.

Suggested Enrichment

What is unique in the local area concerning this topic? Complete enrichment sheets from the instructor's course guide and attach with lesson plan.

MODULE 2
Airway

Lesson 2-2
Practical Lab - Airway

Objective

Objectives Legend

C = Cognitive P = Psychomotor A = Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

At the completion of this lesson, the EMT-Basic student will be able to:

None

AFFECTIVE OBJECTIVES

- Demonstrate the affective objectives of Lesson 2-1: Airway.

PSYCHOMOTOR OBJECTIVES

- Demonstrate the psychomotor objectives of Lesson 2-1: Airway.

Preparation

Motivation:

The practical lesson is designed to allow the students additional time to perfect skills. It is of utmost importance that the students demonstrate proficiency of the skill, cognitive knowledge of the steps to perform a skill, and a healthy attitude towards performing that skill on a patient.

This is an opportunity for the instructor and assistant instructors to praise progress and re-direct the students toward appropriate psychomotor skills. The material from all preceding lessons and basic life support should be incorporated into these practical skill sessions.

Prerequisites:

BLS (CPR) and Preparatory.

MATERIALS

AV Equipment:

Typically not required.

EMS Equipment:

Equipment from the list in Lesson 2-1: Airway.

PERSONNEL

Primary Instructor:

One EMT-Basic instructor knowledgeable in airway management.

Assistant Instructor:

The instructor-to-student ratio should be 1:6 for psychomotor skill practice. Individuals used as assistant

instructors should be knowledgeable in airway techniques and management.

Recommended Minimum

Time to Complete: Two hours

Suggested Application

Procedural (How)

Instructor should demonstrate the procedural activities from Lesson 2-1: Airway.

Contextual (When, Where, Why)

Instructor should review contextual information from Lesson 2-1: Airway.

STUDENT ACTIVITIES

Auditory (Hear)

The students should hear the auditory information from Lesson 2-1: Airway.

Visual (See)

The students should see the visual material from Lesson 2-1: Airway.

Kinesthetic (Do)

The students should practice the kinesthetic activities from Lesson 2-1: Airway.

INSTRUCTOR ACTIVITIES

Supervise student practice.

Reinforce student progress in cognitive, affective, and psychomotor domains.

Redirect students having difficulty with content (complete remediation forms).

Evaluation

Practical: Evaluate the actions of the EMT-Basic students during role play, practice or other skills stations to determine their compliance with the cognitive and affective objectives and their mastery of the psychomotor objectives of this lesson.

Remediation

Identify students or groups of students who are having difficulty with this subject content. Complete remediation sheet from the instructor's course guide.

Suggested Enrichment

What is unique in the local area concerning this topic? Complete enrichment sheets from the instructor's course guide and attach with lesson plan.

MODULE 2

Airway

Lesson 2-3

Evaluation - Airway

Objectives

Objectives Legend

C = Cognitive P = Psychomotor A = Affective

1 = Knowledge level

2 = Application level

3 = Problem-solving level

COGNITIVE OBJECTIVES

At the completion of this lesson, the EMT-Basic student will be able to:

- Demonstrate knowledge of the cognitive objectives of Lesson 2-1: Airway.

AFFECTIVE OBJECTIVES

At the completion of this lesson, the EMT-Basic student will be able to:

- Demonstrate knowledge of the affective objectives of Lesson 2-1: Airway.

PSYCHOMOTOR OBJECTIVES

At the completion of this lesson, the EMT-Basic student will be able to:

- Demonstrate proficiency in the psychomotor objectives of Lesson 2-1: Airway.

Preparation

Motivation:

Evaluation of the student's attainment of the cognitive and affective knowledge and psychomotor skills is an essential component of the EMT-Basic educational process. The modules are presented in a "building block" format. Once the students have demonstrated their knowledge and proficiency, the next lesson should be built upon that knowledge. This evaluation will help to identify students or groups of students having difficulty with a particular area. This is an opportunity for the instructor to evaluate their performance, and make appropriate modifications to the delivery of material.

Prerequisites:

Completion of Lessons 2-1 through 2-2.

MATERIALS

AV Equipment:

Typically none required.

EMS Equipment:

Equipment required to evaluate the student's proficiency in the psychomotor skills of this module.

PERSONNEL

Primary Instructor:

One proctor for the written evaluation.

Assistant Instructor: One practical skills examiner for each 6 students.

Recommended Minimum
Time to Complete: One hour

Presentation

Declarative (What)

- I. Purpose of the evaluation
- II. Items to be evaluated
- III. Feedback from evaluation

Suggested Application

Procedural (How)

1. Written evaluation based on the cognitive and affective objectives of Lesson 2-1.
2. Practical evaluation stations based on the psychomotor objectives of Lesson 2-1

Contextual (When, Where and Why)

The final lesson in this module is designed to bring closure to the module and to assure that students are prepared to move to the next module.

This modular evaluation is given to determine the effectiveness of the presentation of materials and how well students have retained the material. This is an opportunity for the students to make necessary adjustments in study habits or for the instructor to adjust the manner in which material is presented.

INSTRUCTOR ACTIVITIES

Supervise student evaluation.

Reinforce student progress in cognitive, affective, and psychomotor domains.

Redirect students having difficulty with content (complete remediation forms).

Remediation

Identify students and/or groups of students who are having difficulty with this subject content. Complete a remediation sheet from the instructor's course guide. If students continue to have difficulty demonstrating knowledge of the cognitive and affective objectives, or demonstrating proficiency in psychomotor skills, the students should be counseled, remediated and re-evaluated. If improvements in cognitive, affective or psychomotor skills are not achieved, consideration regarding the ability of the student to progress in the program should be taken into account.

